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Table V. contains the results of such a test for air as the source of ions in a brass tube of 2.95 cm. diameter and .300 mg. of radium salt as the ionizing agent placed at a distance 27.7 cm. from the electroscope and approximately 1 cm. above the slit.

TABLE VI

Thickness of Lead Over Slit	Vel. in Tube in Cm. per Sec.	Exp. Ionization in Divs. per Min.	Calc. Ionization in Divs. per Min.	Recombination Constant: $\alpha$
Slit bare.....	24.8	*210	210	.0086
	19.4	150	156	
	16.6	*121	121	
	15.2	105	108	
.05 mm.....	13.8	90	102	.015
	24.8	*98.2	98.2	
	19.4	68.0	68.0	
	15.2	*46.2	46.2	
	13.8	40.1	42.6	

Table VI. gives results obtained for X-rays as ionizing agent, the slit being placed 27.7 cm. from the electroscope, with an air velocity in the brass tube of 2.95 cm. diameter. Table VII. records values for an X-ray ionizing source at 125.3 cm. from the electroscope, other experimental conditions remaining the same.

TABLE VII

Thickness of Lead over Slit	Vel. in Tube in Cm. per Sec.	Exp. Ionization in Divs. per Min.	Calc. Ionization in Divs. per Min.	Recombination Constant: $\alpha$
Slit bare.....	30.4	*105.5	105.5	.0088
	24.8	69.0	65.5	
	19.4	44.5	43.0	
	16.6	*32.4	32.4	
.05 mm.....	31.8	*68.2	68.2	.00923
	26.3	52.4	48.0	
	19.4	*33.2	33.2	
	18.0	28.5	29.4	
.1 mm.....	15.2	21.8	23.7	.020
	21.8	*31.7	31.7	
	26.3	24.7	26.7	
	23.5	20.3	20.2	
Slit bare.....	18.0	*14.9	14.9	.0080
	16.6	13.8	13.5	
	30.4	*102.5	102.5	
	23.5	63.2	59.5	
	18.0	*38.8	38.8	
	15.2	27.2	30.8	

The lack of saturation in the electroscope for large ionization currents would tend to give too small a value for the recombination constant, while diffusion effects at the smaller

velocities through the tube would increase it. Neither of these causes, under the experimental conditions, would appear to be sufficient to explain the larger values obtained for the recombination constant for the more penetrating radiations.

I am indebted to the Providence Gas Co. for the gas meter which was used, also for its careful calibration before and after the experiments.

P. B. PERKINS

BROWN UNIVERSITY,  
June 28, 1917

### BOSTON MEETING OF THE AMERICAN CHEMICAL SOCIETY. III

DIVISION OF BIOLOGICAL CHEMISTRY

C. L. Alsberg, *Chairman*

I. K. Phelps, *Vice-chairman and Secretary*

*The relation of the dissociation of hydrogen to enzymatic activity:* HOWARD T. GRÄBER and J. W. M. BUNKER. It was demonstrated that the enzyme "pepsin," in agreement with the other enzymes, invertin and catalase, has an optimum at a definite H. ion concentration and that the presence of other ions exerts an influence which is not measurable, yet not negligible. It was shown that in the case of the weakly dissociated organic acids the buffer effect of the protein added has a marked effect upon the dissociation of the acids, but that when the concentration of the H ions was made equal to that of 3 per cent. HCl by considering temperature and protein the organic acids are equal to 3 per cent. HCl as activators for peptic digestion.

*On the origin of the humin formed by the acid hydrolysis of proteins III. Hydrolysis in the presence of aldehydes II. Hydrolysis in the presence of formaldehyde:* ROSS AIKEN GORTNER and GEORGE E. HOLM. Hydrolysis in the presence of formaldehyde completely alters the nitrogen distribution obtained by Van Slyke's method. Black insoluble humin is formed from tryptophane and no other known amino acid is concerned in the reaction. The primary reaction of black humin formation involves only the indole nucleus and not the  $\alpha$  amino group of the aliphatic side chain of tryptophane. Formaldehyde forms a soluble humin with tyrosine which is precipitated by  $\text{Ca}(\text{OH})_2$ . Hydrolysis in the presence of formaldehyde causes enormous increases in the ammonia fraction, but the increase is not due to ammonia, but to volatile

alkaline compounds. The detailed paper will appear in the *Jour. Amer. Chem. Soc.*

*The effect of prolonged acid hydrolysis on the nitrogen distribution of fibrin, with especial reference to the ammonia fraction:* ROSS AIKEN GORTNER and GEORGE E. HOLM. Fibrin was boiled with 20 per cent. HCl for varying periods of time ranging from 1 hour to 6 weeks, the ammonia fraction increases continuously, showing a 150 per cent. increase at the end of six weeks over that obtained at the end of twelve hours. This increase in ammonia comes almost entirely from the deamination of mono amino acids. The ammonia fraction of a twenty-four- or forty-eight-hour hydrolysate can not be taken as an absolute measure of amide nitrogen, for some "deamination" nitrogen is undoubtedly present, the amount depending both upon the particular protein and the length of hydrolysis. The paper will appear in the *Jour. Amer. Chem. Soc.*

*Comparative analyses of fibrin from different animals:* ROSS AIKEN GORTNER and ALEXANDER J. WUERTZ. Fibrin has been prepared from the blood of cattle, sheep and swine and the nitrogen distribution determined by Van Slyke's method. No differences significantly greater than the expected experimental errors were found. It would thus appear that fibrin from any of these three sources can be used interchangeably in experimental work without invalidating the results. Whether or not this is true for fibrins from other sources remains still an open question.

*The nitrogen distribution in protalbinic and lysalbinic acids:* ROSS AIKEN GORTNER and CORNELIA KENNEDY. Lysalbinic and protalbinic acids were prepared from egg albumen by Paal's method and their nitrogen distribution, together with that of the original egg albumen, determined by Van Slyke's method. No marked difference was observed in any of the fractions, although both of the derived products show a somewhat greater apparent lysine content. This is probably due to ornithine derived from arginine. The analyses furnish no evidence as to whether or not these "acids" are true chemical compounds or as to whether or not their structure is more simple than is that of egg albumen. The paper will appear in the *Jour. Amer. Chem. Soc.*

*On the relative imbibition of glutens from strong and weak flours:* ROSS AIKEN GORTNER and EVERETT H. DOHERTY. The gluten was washed from both "strong" and "weak" flours and the hydration capacity of the colloids measured by im-

mersing weighed disks in different concentrations of certain acids, allowing them to remain a definite length of time and again weighing. Lactic and acetic acids produced greatest imbibition, the form of these hydration curves being very different from those of hydrochloric and oxalic acids which produced much less hydration. The gluten from a "weak" flour has a much lower rate of hydration and a much lower maximum hydration capacity than has the gluten from a "strong" flour. Gluten from a "weak" flour changes from a gel to a sol at a much lower degree of hydration than does that from a "strong" flour. There is an inherent difference in the colloidal properties of the glutens from "strong" and "weak" flours and these glutens would not be identical even if the flours had originally had the same salt and acid content. The paper will be published in *Jour. Agr. Res.*

#### ORGANIC DIVISION

J. R. Bailey, *Chairman*

H. L. Fisher, *Secretary*

#### *Joint Session with Physical and Inorganic Division*

*The composition of oil of cassia. II:* FRANCIS D. DODGE. In a previous paper, the writer and A. E. Sherndal have reported the examination of the alkali-soluble portion of the oil of cassia, binding, as new constituents, coumarin, salicylic aldehyde, salicylic and benzoic acids, and a liquid acid, not identified. The writer has recently examined the aldehydes present in the oil, and has identified, as minor constituents, benzaldehyde and methyl-salicylaldehyde. The latter was isolated as the oxime, melting at 90°, and identified by conversion into methyl salicylic acid. No positive indication of the presence of hydrocinnamic aldehyde was found.

*Molecular rearrangements in the camphor series. The decomposition products of the methyl ester of the isoaminocamphonanolic acid. A new reaction involving the formation of the methyl ether of a hydroxy acid:* WILLIAM A. NOYES and GLENN S. SKINNER. Several years ago L. R. Littleton and one of us were engaged upon the study of the decomposition of isoaminocamphonanolic acid with nitrous acid. Cis-camphonololactone was the only product identified. We have undertaken the study of the decomposition of the methyl ester with the intention of separating the products by fractional distillation under diminished pressure. The products that would be normally expected are a methyl ester of a hydroxy (trans-camphonolic) acid with hydroxyl in place of the

